URBAN SEDIMENT CAN BE CONTROLLED

I welcome this opportunity to meet with you who direct the destinies of some of America's leading counties and conservation districts. You have many challenges on your time and your conscience; I hope you will take up the challenge of sediment control as a part of your larger quest to match environmental quality with economic growth.

Sediment control is vitally important to your counties. I hope that the film last night and Senator Randolph's talk this morning have driven home that point. My mission this morning is to suggest some alternatives to sediment production--a major pollution problem--and to indicate the kinds of assistance that the USDA, the Soil Conservation Service, and local soil and water conservation districts can provide in this area. Then you'll hear a panel discussion of some of our experiences.

Speech by Norman A. Berg, Associate Administrator, Soil Conservation Service, at the National Conference on Sediment Control, Washington, D. C., September 15, 1969.

I'll begin by discussing what SCS and conservation districts have been up to for the past three decades, and how their activities and interests have come to mesh with yours.

The Soil Conservation Service began official life in 1935 in the Department of Agriculture, after a brief time as the Soil Erosion Service over in the Interior Department. SCS was charged with helping land owners and operators fight a national menace--loss of soil by wind and water--that had ravaged much of the country, particularly the deep-gullied Southeast and a Great Plains that was being bowled over by dust.

Several concepts took hold rather quickly in our business:

First, that we couldn't get very far by Federal edict--that conservation would be successful only through active local leadership in setting goals, in planning, and in carrying out land use and conservation treatment.

This led to formation of soil conservation districts in every State. These local units of State government were charged with responsibility for conservation work within their boundaries. The USDA and others work with and through them to aid individuals and groups with needed conservation action. Most districts now are organized along county lines, in order to fit their programs more closely with other countywide planning and local government.

A second concept was that no one conservation practice would work everywhere--conservation had to fit the local climate, topography, and soil conditions. Soil surveys became an essential aid in fitting conservation treatments to the land and deciding what alternatives there were for proper use of the land. What is a soil survey? It is a set of maps that shows the location and extent of the different kinds of soil. A text that accompanies the maps describes the soils in an area, and how their properties influence the uses that may safely be made of a tract of land, and the treatment that it needs to keep it from being damaged.

There are more than 70,000 kinds of soils in the United States. There may be several kinds in a small area, each of which may react differently to uses and treatments. Hence the importance of knowing the soils!

A third concept was that you couldn't separate soil and water--the use or control of one affects the useability of the other. This led to watershed protection projects to prevent floods and protect land from damage.

A fourth concept was that you can't really separate rural problems from urban problems in resource conservation. Soil and water problems respect no manmade boundaries, and many of the conservation techniques apply equally well on the farm and in town. Many communities have asked for conservation help. Many have found soil surveys just as useful in planning urban conservation needs and land use patterns as in making farm or ranch decisions--so useful, in fact, that many communities are now sharing the cost of soil surveys in order to speed their completion for land-use planning.

This same concept led to broader involvement in watershed projects, creating new recreation opportunity and new water supplies for municipal and industrial use. The ability of conservation work to generate new industry and tourism and economic stability led to the resource conservation and development projects, where conservation work over a multicounty area helps communities grow to join the economic and social mainstream of American life.

It is in our work with growing communities--as district cooperators or project sponsors--that we come to grips with a growing sediment pollution problem. It constitutes an instant reversal of protective land use for many years. It poses a threat to reservoirs and flood-control structures. It is an expensive and destructive pollution problem.

We haven't finished the sediment control job on farm or forest or rangeland, by any means. But sediment in suburbia is an increasingly challenging and difficult frontier of conservation.

Consider some facts:

The modern shopping center using 25 acres of land covers 19 acres with rooftop, blacktop, or concrete, including space for parking, access roads and streets, and curbing. The ability of the remaining six acres to absorb water is usually cut way down because of grading, shaping, and other construction operations. A similar situation prevails in a new industrial area, where most of the workers commute by automobile and where modern, efficient materials handling and processing equipment is used. This mass alteration of land is creating real problems in water control.

A study recently released by the American Institute of Planners titled, "Environment and Change--the Next Fifty Years," reveals that land is presently being urbanized at the rate of 3,000 acres a day, and the rate can be expected to accelerate. This is the scale of our concern--how to safely alter the use of 3,000 acres of land a day.

The study states further that not only will there be more people; they will take more land per person. In 1850, 1,000 urbanites used about 10 acres; in 1920, they used 30 acres, and in 1950 they used 1,000 acres. We're in an urban-suburban competition for space that isn't about to let up.

SET FOR SLIDES

Now, with the help of some slides, I want to show you what the sediment problem is and what can be done about it. As we go through these, look for your own county or district. If it's in a "before" picture, I'd like to see you come back next year and bring an "after" picture. If you're already in the "after" column, my hat's off to you.

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Let's look at a typical piece of the rural conservation scene--a tract of land used for a purpose that suits the characteristics of the soil, and fitted with vegetation and planting methods that control water flow across the property. The land is protected, and productive, and attractive.

2 Now let's suppose that a metropolitan area grows out to meet this property. This happens to at least a million acres of farmland a year--that's 3,000 acres a day. The land waits for a time, idle but still protected...

3 Then the bulldozers come in, and as we say about the Washington Senators, it's a whole new ballgame. Acre upon acre is laid bare as farmland turns into land for housing or stores or highways or airports. Sometimes it lies unprotected for years while financing is arranged. But nature doesn't wait to begin her work.

4 With the loss of ground cover, water moves across the land on its own terms now, faster and more concentrated, picking up soil as it flows and leaving gullies behind.

5 Leaving land wide open to the elements like this can increase soil erosion in a year's time from 50 tons per square mile to more than 25,000 tons per square mile.

6 The eroded soil moves from higher ground to lower ground,

7 and is carried along in the water into storm sewers.

8 Eventually, it reappears downstream. Here, a muddy tributary from a construction site joins a relatively sediment-free stream.

9 Most of the soil particles don't stay suspended in the water for long. Many are dropped out along the course of the stream, filling the natural streambed and clogging expensive water disposal structures.

10 Many other soil particles reach lakes and reservoirs. They reduce the storage capacity for municipal water supplies that already are strained to the limit in many communities now. They increase water bills, and often they destroy the lakes' usefulness for recreation and scenic enjoyment.

11 This sign in a cemetery sums it up pretty well.

12 But the cost of removing sediment and restoring lakes and waterways to tranquil beauty and usefulness is staggering.

13 Over a billion cubic yards of sediment is deposited in reservoirs each year, and nearly half a billion cubic yards is dredged from rivers and harbors.

Dredging can cost from 50 cents to two dollars a cubic yard, a bill that is paid not so much by the people who created the problem, but by taxpayers, many of them far downstream from the critical source of the sediment.

A more direct cost to homeowners may occur when sediment fills a streambed and robs it of its capacity to carry storm runoff.

The result is flooded yards and basements, and when the waters recede, an expensive cleanup job begins. These are all damages resulting downstream from the unwise construction practices.

But what about the construction site itself? You can't take away tons of soil without effect--and the effect can be very expensive...

Careful construction work is washed out in a single rainstorm... backyards disappear downhill...

or threaten to engulf the house...

and roads wash out before they can be paved. Is sediment control so expensive that the risk of construction damage or legal action by downstream landowners is preferable? I don't think so!

23 It is possible to have more homes for more people without first wrecking the landscape and polluting our water.

24 It is possible to carve out a space for a house without removing every tree in the vicinity.

25 It is possible to build commercial or industrial centers a piece at a time without leaving the whole site bare for years...

26 It is possible to build highways, even great ones, without ruining waterways for miles downstream...

How to do it? Many of the answers are already available...

27 First--and foremost--is to plan for sediment control as a regular part of any construction planning, with whatever technical help may be needed. And follow the plans. It is far cheaper to foresee problems and prevent them than to try and correct them later.

28 Second, find out about the soils--how well they will drain, how erosive they are, what kinds of plants are needed to protect them during or after construction, and other facts. This is equally important as finding out how well the sites will support the buildings or roads.

29 Third, leave vegetation on the ground until just before construction, and disturb only as much area as is needed at one time. This apartment-house builder did clear and grade a large area, but he tied down with grasses the part of the land he would build on later.

30 Fourth, help water move more safely off the property by putting in storm drains early...

31 And by getting quick vegetation on natural channels between buildings ...

32 And below storm drains or other outlets. This kind of grassed waterway has been used on farmland for many years to carry water safely off the field without erosion.

33 Fifth, hillsides and roadbanks need to be stabilized quickly. On gentle slopes, seeding or sodding may work well...

34 But on steeper slopes, seeding lawngrasses may not do the job at all...

35 Sod may be the answer, to give quick cover or to do the job where seeded grass has failed. But I question the results here; this is not an overhead photo of sodding on a reasonably gentle slope...

36 but a picture of sodding a nearly vertical cliff, where chances of any grass surviving are slim, and chances of mowing and maintenance are even slimmer.

37 Slopes can be protected until plants are established, by using a straw mulch that helps hold the soil and keep it moist while grass grows. A light asphalt spray would be effective here, too.

38 Or, you can hold the soil down with jute matting, which rots away after its job is done and the grass takes over.

39 A close-up shows how tight the matting holds, but how it still leaves room for grass to grow.

40 In critical areas, using boards for temporary terraces may protect the site for a few weeks until plants can get a strong foothold.

41 All of these methods prove the point that banks can be beautiful.

42 Another vital step is to place sediment traps or basins at low points in the construction site to trap soil that does get loose.

Some erosion is inevitable while the land is disturbed, but these basins will keep sediment from leaving the site and having to be dredged out of reservoirs and channels at taxpayer's expense.

Sediment basins simply hold the water long enough to settle out soil particles, and may later serve as attractive ponds.

These are just some of the principles and practices that can be followed to create attractive buildings at the lowest cost to the community and its environment. There is no magic; neither are all the answers simple. We don't have all the answers yet, by any means. SCS and conservation districts are working together in trying out and adapting other farm-based techniques to new situations.

The Agricultural Research Service in the Department of Agriculture has more than 400 scientists engaged in conservation research, and sedimentation studies are a major part of this effort. They are studying how sediment is made, transported, and distributed in channels, lakes, and reservoirs. They are developing techniques and equipment for measuring and reducing that sediment.

46 Studies involve use of everything from gravel drains to prairie hay sprayed with asphalt, to flowering ornamentals on highway embankments, to concrete block revetments. Their aim is to find techniques that landowners, district and county governing bodies, and others can use in the fight against sediment damage.

Their concern is that each year over a billion cubic yards of sediment are deposited in our major reservoirs. This represents enough water capacity to supply a city of 5½ million persons for a year.

Their concern is for the many other pollutants that are carried with sediment in uncontrolled water, often adsorbed on the surface of the soil particles.

So, just as my agency and conservation districts took the challenge of wasted land...

and found an opportunity for a beautiful land--just as we've helped make rural America not only productive but also a fine place to live and work--

51 you have a challenge in both town and country of changing the use of land without ruining the land and the water that drains from it.

52 You have an opportunity to assure the kind of pleasant surroundings that city people move out to find in the first place.

LIGHTS Principles and techniques are available, then, or on the way, to avoid sediment damage. How to get them used? You will hear later this morning from some of our friends about their pioneering experiences. But let me now suggest some general guidelines that may help in bringing about a workable sediment control program in your county.

First, it would be helpful if every builder in your county had a code that followed along the lines I have outlined this morning. To summarize:

1. Choose the site that has the right soil properties, including natural drainage topography, for the intended use.

2. Use areas with soils not well suited to intensified development for parks and other open space uses. And don't forget the continuing needs for wildlife habitat. We need birds and fish and other animals in town and country.

3. Save trees and other existing vegetation wherever possible. They enhance the beauty of the subdivision(and thus have a dollar value), they provide cooling shade and they help control erosion.

4. Expose as small an area of land as practical at any one time during development.

5. Expose the land for as short a period as possible.

6. Hold lot grading to a minimum.

7. Plan streets to avoid long stretches of excessive grade--that is, fit the development to the contour of the land.

8. Provide adequate drainage to streets and from streets to storm sewers or other runoff disposal systems so water does not erode the land or flood property below.

9. Plant temporary vegetation during development in critical areas subject to erosion.

10. Build sediment basins to catch sediment from runoff waters during development.

11. Provide for disposing of increased runoff caused by changed land formations. And,

12. Plant permanent vegetation and install structures as soon as possible.

How do we get every builder to adopt and follow such a code?

I suggest that plans for sediment control will be carried out only if they are initiated and followed through by people who know what they are doing and who care about the consequences. Responsibility must be transferred all the way along the line from the people who plan a change, to those who review it, to the builder, the bulldozer operator, the sediment control inspector, the landscape architect, the nurseryman, the homeowner.

At every step there must be understanding and awareness of the ordinances and techniques for sediment control--and good standards and specifications for them.

We must create public awareness of the need for sediment control to muster the support needed to make recommendations into regulations. We must make sediment control in urbanizing areas a stated policy of the county government and all agencies that operate in the county.

We must learn to manage people as carefully as soil and water. Builders are businessmen, not monsters. They deserve a workable set of regulations and specifications. They deserve helpfulness, and they deserve not to be pushed too fast, too far, or too soon. They deserve the kinds of laws that put the ethical ones on an even-money basis with those who now cut corners, cut costs, and create critical sources of sediment.

There are different versions of basic regulations. For example, (1) pre-grading, and building permit review by the conservation district; (2) review plus performance bonds for conservation measures; and (3) review plus penalties for those who violate standards. There are others. Determine what will work best in your own situation. Fit it into your review procedures for building and grading permits, and assign an effective unit of local government to be responsible for inspection, regulation, and followup.

And finally, remember that the time for action is not when you need the dredge. Planning is the keyword--choosing sites carefully on the basis of soil surveys and other information, and planning erosion control measures that fit the soils, topography, and climate. There are no cure-alls; measures must be suited to each site's peculiar needs, on the basis of diagnosis and experience and skill.

The Soil Conservation Service and soil and water conservation districts stand ready to offer their assistance. You'll find experience and skill as well among land and water contractors; landscape architects; nurserymen; and others. With the skills available right now, urban sediment can be controlled.

The guide for county governments that you will help develop this week can be a major contribution to removing sediment as a major problem in growing America. Make the guide as comprehensive and as workable as you can. Make it flexible enough to fit every county, every conservation district. Make it a valuable tool in helping improve the quality of the environment as America's communities grow. It is important work--important to your county and to the Nation. I wish you Godspeed.

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